Amendments to the Specification

IN THE ABSTRACT OF THE DISCLOSURE

Attached hereto is a replacement Abstract with markings to show amendments.

IN THE WRITTEN DESCRIPTION

Please replace paragraph [0007] with the following amended paragraph:

[0007]

As a result of diligent study, the inventors discovered that when a first reducing agent (such as formalin or glyoxylic acid) and hypophosphorous acid or a hypophosphite (such as sodium hypophosphite, potassium hypophosphite, or ammonium hypophosphite) are used at the same time in an electroless copper plating solution, the initial plating reactivity via a metal catalyst is higher, and that when a stabilizer to inhibit copper deposition (such as 2,2'-bipyridyl, imidazole, nicotinic acid, thiourea, 2-mercaptobenzothiazole, sodium cyanide, or thioglycolic acid) is also used at the same time, excessive deposition reactions generated in some portion will be prevented, and as a result, uniform plating can be achieved at lower temperatures even on a semiconductor wafer (such as a silicon wafer, a semiconductor wafer made of GaAs·InP or the like, or these wafers with a tantalum nitride film, titanium nitride film, tungsten nitride film, tantalum film or the like formed thereon) or other such mirror ~~surface~~surfaces with an average surface roughness of less than 10 nm. The present invention is particularly effective in the production of thin films with a thickness of 500 nm or less.

Please replace paragraph [0012] with the following amended paragraph:

[0012]

The electroless copper plating solution of the present invention makes use of hypophosphorous acid or a hypophosphite as a second reducing agent along with a first reducing agent at the same time, which raises the plating reactivity higher than that when a first reducing agent is used alone, and as a result, uniform plating is achieved on a mirror surface such as a semiconductor wafer, on which a plating reaction hardly occur, at lower temperatures. While hypophosphorous acid and hypophosphites do not exhibit a reductive action on copper, they exhibit a highly reductive action on a catalyst metal such as palladium, so they are effective at raising the initial plating reactivity via a catalyst metal. By the ~~enhance~~enhancement of plating reactivity, plating at a lower temperature is realized. The further use of the stabilizer to inhibit copper deposition increases solution stability and inhibits the excessive deposition reactions that occur in some parts, and as a result, the particles of deposited copper tend to be finer and more uniform. Since deposition uniformity at the start of plating is higher when the plating solution of the invention is used, a uniform thin film with a thickness of 500 nm or less can be formed on a mirror surface whose average surface roughness is less than 10 nm such as a semiconductor wafer.

Please replace paragraphs [0021] and [0022] with the following amended paragraphs:

[0021]

The ~~followings~~following, although not intended to be limiting, are favorable methods to fix a catalyst for electroless copper plating: the method disclosed in International Patent Publication No. WO01/49898, in which a pretreatment agent is prepared by reacting or mixing in advance a noble metal compound and a silane coupling agent having a functional group with metal-capturing capability, and the surface of the material to be plated is treated with this pretreatment agent; the method disclosed in International

Patent Publication No. WO03/091476, in which the surface to be plated is coated with a solution of a silane coupling agent having a functional group with metal-capturing capability, and this surface is then coated with an organic solvent solution of a palladium compound; the method disclosed in Japanese Patent Application No. 2003-163105, in which the article to be plated is surface treated with a silane coupling agent having a functional group with metal-capturing capability in one molecule, the article is heat treated at a high temperature of at least 150°C, and the article is surface-treated with a solution containing a noble metal; and a method in which the article to be plated is surface-treated with a solution obtained by reacting or mixing in advance a noble metal compound and a silane coupling agent having a functional group with metal capturing capability in one molecule, and the article is heat treated at a high temperature of at least 150°C.

[0022]

The above-mentioned silane coupling agent having metal-capturing capability is preferably one obtained by a reaction of an epoxy compound and, an azole compound or an amine compound.

Please replace paragraph [0025] with the following amended paragraph:

[0025]

The above-mentioned silane coupling agent refers to a compound that has an $-SiX_1X_2X_3$ group in addition to the noble metal-capturing group, which originates the above-mentioned azole compound or amine compound. X_1, X_2, and X_3 are each an alkyl group, halogen, alkoxy group or the like, and may be any functional groups that can be fixed to the article being plated. X_1, X_2, and X_3 may be the same or different.

Please replace paragraph [0029] with the following amended paragraph:

[0029]

~~other~~Other examples of the silane coupling agent having a functional group with metal--capturing capability used in the present invention include γ-aminopropyltrimethoxysilane, γ-aminopropyltriethoxysilane, N-β(aminoethyl) γ-aminopropyltrimethoxysilane, N-β(aminoethyl) γ-aminopropyltriethoxysilane, and γ-mercaptopropyltrimethoxysilane.

Please replace paragraph [0031] with the following amended paragraph:

[0031]

Using these methods to fix a catalyst further increases the plating uniformity.

When plating is performed using the electroless copper plating solution of the present invention, the material to be plated is immersed in the plating solution. The material being plated is preferably one that has been pretreated as discussed above, so as to fix a catalyst.

Examples

Please replace paragraph [0033] with the following amended paragraph:

[0033]

The above-mentioned silicon wafer with the tantalum nitride film was immersed for 5 minutes at 50°C in a pretreatment agent for plating prepared by adding a palladium chloride aqueous solution so as to be 50 mg/L to 0.16 wt% aqueous solution of the silane coupling agent that was the equimolar reaction product of imidazole and γ-glycidoxypropyltrimethoxysilane. After this, the wafer was heat--treated for 15 minutes at 200°C, and then was electroless plated with copper for 5 minutes at 60°C. The composition of the plating solution was copper sulfate 0.04 mol/L, ethylenediaminetetraacetate 0.4 mol/L, formalin 0.1

mol/L, sodium hypophosphite 0.1 mol/L, and 2,2'-bipyridyl 10 mg/L, and the pH was 12.5 (pH regulator: sodium hydroxide). The plating film was formed uniformly without unevenness over the entire surface, and the film thickness was 50 nm.

Example 2